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EXTRA EDITION

Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

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Col. Ayres Sees Business Prospects Clearly More Hopeful; Cites Six Reasons

Economist Asserts Replacement Demand Becoming Effective Force; Says Farm Outlook Good and Conditions Abroad Improving

CLEVELAND, June 13.—Col. Leonard P. Ayres, vice-president of the Cleveland Trust Company, economist and business forecaster, takes pains to look upon the bright side of the picture in his mid-month business review, issued by the bank. Among other things, he says:

That business sentiment has made a triple bottom in this depression, which ought to be enough, even in a major depression.

That the agricultural outlook is exceptionally good in nearly all parts of the country.

That replacement demand is at last becoming an effective force in bringing about increases in production of some important classes of manufactured goods.

That the bank's business activity index shows considerable recovery already has been attained.

That business conditions abroad are showing signs of improvement.

Col. Ayres makes no predictions, however, limiting his remarks chiefly to observations on facts and figures. He does not discuss the railroads. He shows that steel production has dropped very sharply and that prices are extremely low. He observes that commitments of most manufacturers of automobiles for materials in June show moderate reductions from those of April. He indicates, in fact, that the basic industries are not now going forward very rapidly.

"In the past," says this national authority on business trends, "the recoveries from business depressions have often been ushered in by sustained increases in the volume of building construction, and by greater outputs of industrial and agricultural equipment. It now seems likely that in the present period sustained increases in the production of consumption goods (such as shoes, underwear, automobile tires and cotton cloth) will precede definite recoveries in the output of the

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M'DONALD INDORSES MOVE TO ROUTE U. S. ROADS AROUND CITIES

CHICAGO, June 13.—Speaking before the executive committee of the Association of State Highway Officials at the Stevens Hotel, Thomas H. McDonald, director of the United States Bureau of Public Roads, indorsed the movement to route through traffic away from the business sections of large cities by means of changing the U. S. road markers.

"Cities all over the country are beginning to realize that through traffic is a detriment to business property as well as residential property, generally speaking," declared Mr. McDonald. "A few years ago communities were petitioning to get federal routes through the main streets of their cities, and many now regret their success.

"In going on record as favoring the principle of circumvention, members of the executive committee of the Association of State Highway Officials believe in giving preference to the most direct routes and in rejecting attempts to divert traffic for the selfish benefit of some hotel group or other commercial enterprise catering to tourists.

"The attention we are giving to the problem of cities in handling through traffic is typical of the general trend throughout the country in highway administration. The nation has made progress in estab-

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S.A.E. Delegates Arrive Early, Anticipating Liveliest Summer Meeting With Full Attendance

Weather Conditions at White Sulphur Springs Ideal For Out-of-Door Programs; Important Discussion Are Expected

By WILLIAM C. CALLAHAN
News Editor

WHITE SULPHUR SPRINGS, W. Va., June 13.—Anticipating a livelier if not larger meeting from the standpoint of attendance, members of the Society of Automotive Engineers began to arrive at the Greenbrier Hotel here from all points of the country early on Saturday morning.

In spite of the fact that the meeting was not scheduled to get under way before Sunday, more than fifty members and their friends were registered at the Greenbrier by Saturday noon.

Weather conditions were ideal, and held promises for the success of all out-of-doors programs scheduled for the week. This, coupled with an exceptionally interesting and educative technical profram, should make this meeting stand out as one o fthe banner meetings in the history of the society.

In addition to the scheduled programs, early arrivals are anticipating an extensive discussion of the present economic situation at the present time and the engineer's place in the economic scheme of the country.

In the corridors of the Greenbrier Hotel, which is the headquarters of the society for the meeting one already begins to catch bits of conversation revolving around gears, alloys, fuels, torque, stresses and what have you in an engineering way.

J. A. C. Warner, general manager of the society got in this morning, and, in spite of a warm train ride, brought his customary infectious smile. Miss McCormick has been here since Wednesday completing the arrangements for handling between 500 and 600 engineers, to say

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ADDITIONAL S. A. E. DELEGATES REGISTER AT SUMMER MEETING

WHITE SULPHUR SPRINGS, W. Va., June 13.—Since the list of members of the S. A. E. and their guests, who are to be in attendance here during the annual meeting next week, Miss McCormick has compiled a further list of late reservations. This list, which, with the one already published in Automotive Daily News, completes the roster of those present for the opening session of the 1931 summer meeting. This additional list is as follows:—

Mr. and Mrs. Donald Alexander, E. G. Budd Manufacturing Company; Mr. and Mrs. A. B. Boehm; Mr. and Mrs. D. M. Borden, New York city; William Fairhurst, General Motors Laboratories; David Ingalls and W. L. Jenkins, Young & Rubican, Inc.; R. F. Jones, Russell Manufacturing Company; W. J. Leaden, William H. Oldacre and J. M. Orr, Equitable Auto Company; W. T. Palmer, Middletown, Conn.; S. Ward and Henry F. Woods, Jr., Young & Rubican, Inc.

Mr. and Mrs. Furber I. Marshall, Marshall Asbestos Company; Vincent Bendix, president, Bendix Corporation; John R. Cautley, Airplane Wheel Brake Division, Bendix Brake Company; Mr. and Mrs. Malcolm Ferguson, Eclipse Machine Company; Mr. and Mrs. Stanley Whitworth. Bendix Aviation; Mr. and Mrs. M. P Whitney, Eclipse Machine; Mr. and Mrs. D. K. Moore, Bendix Brake; Mr. and Mrs. Charles Colvin, Pioneer Instrument.

Mr. and Mrs. Don R. Scott, Hydraulic Brake Company; Mr. and Mrs. W. L. McGrath, Bendix Aviation; Charles Marcus, Bendix Aviation; V. W. Kliesrath, Bragg Kliesrath; H. A. Gossner, Bendix Aviation; H. L. Sherlock, S. Johnson, Bendix Westinghouse Automotive Air Brake; J. R. Bartholomew, Bendix Brake; A. C. Chambers, Bendix Brake; W. A. Frazer; Eclipse Machine; J. C. Ferguson, Eclipse

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TRUCK INTERESTS FACE SERIOUS RESTRICTIONS IN ILLINOIS LEGISLATION

CHICAGO, June 13.—Motor truck interests in Chicago and throughout the state today found themselves facing the threat of adverse legislation through passage of a bill in the Illinois House of Representatives imposing serious restrictions on the length and weight of trucks and buses.

If the bill in its present form goes through the senate and is signed by Gov. Emmerson, it will limit the length of any vehicle or combination of tractor and trailer to thirty-five feet. It also provides that until July 1, 1935, the length of vehicles combined with trailers shall not exceed sixty-five feet, and that after that date the length of such combinations shall be limited to forty feet.

On the subject of weight, the bill provides that the maximum gross to be permitted on the road surface through any axle of any vehicle shall not exceed 16,000 pounds; that the gross weight of vehicle and load for four-wheel types shall not exceed 24,000 pounds, and that the gross weight of six-wheeled vehicle

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Four New Nash Series Due During Latter Part of June

Kenosha, Wis., June 13.—It is understood here that during the latter part of June Nash Motors will announce four new series of Nash cars. This report is borne out by production activity at the plant here and also in Racine and Milwaukee. Production has been stepped up to a high rate to provide floor plans and preliminary shipments to dealers throughout the country.

From authoritative sources it has been learned that the four new Nash series will embody a very drfinite development toward comfort and luxury. It is stated that many new features will be found on the new models, including new and snappy body lines. The Nash engineers have devoted their efforts to increasing performance, driving control and comfort and to this end have introduced a great many new ideas in chassis and body design and construction.

GENERAL MOTORS NET EARNINGS WILL COVER FIRST HALF DIVIDENDS

DETROIT, June 13.—Net earnings of the General Motors Corporation for the second quarter of the year may approximate the figures reported for the like period of 1930, or $1.17 a share on the 43,500,000 common shares, according to estimates in financial circles yesterday.

Should net profits approximate this amount, the results for the half year, adding in the 61 cents a share net reported for the first quarter, would more than cover dividend re-

(Continued on Page 3)

FOR quick dispatch of S. A. E. news this week, see

William C. Callahan

news editor of Automotive Daily News, who will be at the Greenbriar from June 13 to June 19.

News received in New York by 11 o'clock in the morning will appear in the issue of this paper distributed next morning at White Sulphur Springs. If you have a news item of any kind, see Mr. Callahan. Remember the difference in daylight saving time.

Sixteen States and D. C. Show May Sales 4% Below April

NEW YORK, June 13.—Sales returns have just been received by Automotive Daily News for two new states, bringing the total now in hand up to sixteen states and the District of Columbia. The total passenger car sales in May, 1931, for these sixteen states and the District were 55,413, which compares with 57,637 in April and with 82,283 in May, 1930.

From these figures we find that passenger car sales in May are running just a shade under 4 per cent. below the levels maintained in April. Without hunting rainbows, we can say that this is an excellent showing. As compared with May, 1930, this year's figures are off about 32 per cent.

Three companies made a record, in that during May, 1931, they registered more pasenger cars than they did in the same month last year. Auburn registered 900 units against 245 in May, 1930; Cadillac registered 212 against 204 and Pontiac registered 2,596 against 2,305. It is interesting to note 149 De Vaux cars registered in these sixteen states and the District. This is De Vaux's first appearance in force in the sales returns, the car having been in production only since March.

Chevrolet registered 17,861 in these states in May, against 20,738 in May, 1930.

Ford in May this year registered 16,730, as compared with 33,755 units during May, 1930.

The states referred to above, from which sales returns have been received, are as follows: Arkansas, Delaware, Idaho, Illinois, Maryland, Minnesota, Montana, New Hampshire, North Dakota, Rhode Island, South Carolina, South Dakota, Utah, Virginia, West Virginia, Wisconsin and the District of Columbia.

Complete Technical Program Of S. A. E. Meeting

THE complete technical program for the annual summer meeting of the Society of Automotive Engineers, meeting at White Sulphur Springs, W. Va., June 14 to 19, is as follows:

MONDAY, JUNE 15

10.00 A. M. — Auditorium

FUELS

A. L. Beall, Chairman

Further Developments in Determining Gum in Gasoline—O. C. Bridgeman and E. W. Aldrich, Bureau of Standards

Fuel Line Temperatures in 1931 Motor Cars—O. C. Bridgeman and H. S. White, Bureau of Standards

The Interpolation Method in Detonation Testing—D. B. Brooks, Bureau of Standards

Carburetor Design for the Fuel Research Detonation Engine—C. S. Kegerries, consulting engineer, Toledo

10.00 A. M. — Ballroom

TRANSPORTATION

F. K. Glynn, Chairman

Utilization of Motor Coaches—D. A. Smith, Department of Street Railways, Detroit, Mich.

8.30 P. M. — Auditorium

DIESEL ENGINES

W. F. Joachim, Chairman

Automotive Diesel Fuels—W. H. Butler, Standard Oil Co. of New Jersey

Practical Experience With Devices for Damping Torsional Vibrations—Erich Sandner, consulting engineer, Dortmund, Germany, and J. B. Frauenfelder, consulting engineer, Philadelphia.

10.30 P. M. — The Pool

Water Carnival

TUESDAY, JUNE 16

10.00 A. M. — Auditorium

PASSENGER CAR BODIES

L. C. Hill, Chairman

Comfort and Interior Appointments—H. A. Brunn, Brunn & Co., Inc.

What the Body Engineer Wants in a Chassis—R. F. Anderson, Murray Corporation of America

8.30 P. M. — Auditorium

PASSENGER CARS

W. C. Keys, Chairman

The Tear-Drop Car—W. T. Fishleigh, consulting engineer, Detroit

Driving High Speed Cars—J. E. Hale, Firestone Tire and Rubber Company

WEDNESDAY, JUNE 17

10.00 A. M. — Auditorium

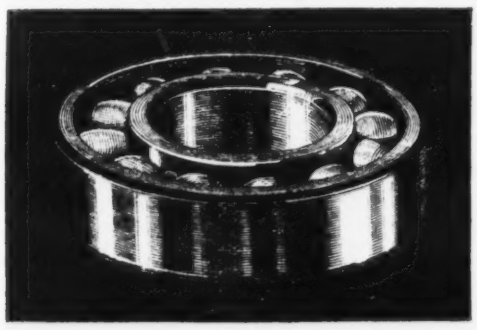
FUTURE DEVELOPMENTS

W. J. Davidson, Chairman

The Field for Synthetic Lubricating Oils—F. W. Sullivan, Jr., V. Voorhees, P. T. Oak and D. P. Barnard, Standard Oil Company of Indiana

The Case in Favor of Cars With Rear Engine Mountings—Herbert Chase, Product Engineering and American Machinist

(Continued on Page 4)



They call it

DIVINE DISCONTENT

The refusal of New Departure engineers to be satisfied even with the best bearing of the moment assures to users, tomorrow's bearing today. 241 million New Departure Ball Bearings in less than 20 years . . . and each one better than its predecessor! The New Departure organization has the will and the skill to do . . . and the means of doing new and better things. The New Departure Manufacturing Company, Bristol, Connecticut

NEW DEPARTURE BALL BEARINGS

'NEW HAVEN' ANSWERS TRUCK WITH OVERNIGHT RAIL FREIGHT SERVICE

NEW HAVEN, Conn., June 13.—Fast overnight rail freight service, with store door pickup and delivery by motor trucks, is the answer of the New York, New Haven & Hartford Railroad to the challenge of the independent truck line. Two fast trains, "The Speed Witch" and "The Maine Bullet," will connect Boston and Baltimore and Portland and New York daily except Sunday.

Store-door service on both pickup and delivery will be handled by New England Transportation Company trucks in Massachusetts, Rhode Island and Connecticut, and by the Boston & Maine Transportation trucks in Northern New England. The "Maine Bullet" will operate between Portland, Me., and New York, via "New Haven" and Boston & Maine, while the "Speed Witch," Boston to Baltimore, will be taken from the "New Haven" at New York by the Pennsylvania Railroad.

These trains, according to John J. Wall, general traffic manager of the "New Haven," "will provide a service at the existing regular freight rates which will make a letter mailed on the day of shipment too slow to beat the shipment to destination." The trains will be operated at a speed unapproached in the annals of New England railroading, traveling at approximately the same rate as some passenger trains.

"The Maine Bullet" starts operation June 15, while the "Speed Witch" has now been running for several weeks. Motor truck routes will spread out fan-wise from various points along the main line, tapping cities and towns, and delivering their merchandise to the train at the various junction points.

The "New Haven" is constantly increasing its motor truck fleet, and will probably have over 200 trucks in operation by the end of 1931. These trucks are operated by the New England Transportation Company, a subsidiary which also controls passenger bus lines.

BASKETT EVANSVILLE'S GRAHAM DISTRIBUTOR

Evansville, Ind., June 13.—Robert W. Baskett, since 1929 Southern sales manager of the Graham-Paige Motors Corporation, Detroit, has purchased the Graham-Paige Company of Evansville, and taken over the distributorship for this territory. The enterprise will operate as Robert W. Baskett, Inc., with Mr. Baskett as president and general manager and James H. Manion as vice-president and assistant manager.

Mr. Baskett has been associated with the three Graham brothers since 1914, when he became Robert Graham's secretary. In 1922 he was transferred to the Graham's truck business, serving as supervisor of district offices. In 1927, when the Grahams purchased Paige-Detroit, Mr. Baskett organized the sales districts throughout the country, and in 1929 was made sales manager of the Southern division.

WASHINGTON STATE BUS REVENUE INCREASES 40%

Seattle, Wash., June 13.—The Washington Motor Coach System, which includes several important truck operations in this state, has had a successful year, according to a report of C. B. Fitzgerald, its president.

Gross revenues for the past year were $711,000, an increase of 40 per cent. over the previous year.

During the year the company spent $150,000 on new terminals in Port Angeles and Ellensburg, Wash.

For this year the company has a $100,000 appropriation for better equipment.

TAKES DISTRIBUTORSHIP

Jamestown, N. Y., June 13.—The firm of Arnson's, Inc., wholesale and retail automotive accessory concern, with headquarters at 3d and Lafayette Streets, has taken the distributorship in southwestern New York for the products of the Safety Free-Wheeling Company.

SPARKS from DETROIT

Detroit at S. A. E. Session

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S. A. E. History Reviewed

* * *

Cattlemen Like Car Radio

* * *

Graham-Paige's Gains

* * *

Chris Sinsabaugh—Detroit Editor

SEVENTY-FIVE of the members of the Detroit section left the industry's capital on a special Pere Marquette train Saturday night for the midsummer meeting of the Society of Automotive Engineers. Fifty Clevelanders were picked up en route and the combined aggregation of technical brains docked in White Sulphur Springs Sunday morning, prepared for a week of activity.

The Detroiters left behind as an outpost sentry this column conductor, who paces up and down in the Fisher Building, thinking of other midsummer meetings and raking up pleasant memories of the S. A. E., of those early days when three men got this big idea and had the courage and resourcefulness to put it over. The trio consisted of Horace M. Swetland, Allen H. Whiting and E. T. Birdsall, and the movement started during the New York show of 1904.

* * *

AT the time there was the mechanical branch of the Association of Licensed Automobile Manufacturers, headed by the late Henry Souther, which looked after technical matters of the members of that body. But the three pioneers wanted a society of engineers engaged in the design and construction of automobiles, membership in which would not be confined to any one group, such as the A. K. A. M.

So they got to going and the late Andrew L. Riker, of the Locomobile Company, was chosen the first president, with E. T. Birdsall as secretary. The name Society of Automobile Engineers was chosen, but the permanent organization was not perfected until January, 1905, when the Riker administration was continued.

* * *

THE S. A. E. cornerstone was really laid with the adoption of the standardization plan for which Howard E. Coffin is given the credit for his initiative in getting the S. A. E. behind it. That one thing alone has made the association well worthwhile, but that is only a small part of the good accomplished by this live organization which now stands as one of the greatest in the world. It was in 1916 that the scope of this technical body was greatly broadened, taking in those from the motor boat, farm tractor, motorcycle and airplane industries, and it became the Society of Automotive Engineers.

* * *

PRESIDENT VINCENT BENDIX looks back over a list of brilliant predecessors who have worn his crown, men like Andrew L. Riker, Howard E. Coffin, Henry Souther, Herbert W. Alden, Henry M. Leland, Howard Marmon, Jesse G. Vincent, David Beecroft, Henry M. Crane and Henry Horning, each and every one an engineer whose work has become a part of the history of the industry.

But be it said without fear of contradiction, the present incumbent has earned his niche in our hall of fame, and let us not forget the late Coker F. Clarkson, who, possibly more than any other one man, should be credited for the present standing of the society.

* * *

THEY tell me across the street at Delco-Remy in the General Motors Building that the cattlemen have taken up automotive radio in a serious way because it is proving its case in more ways than one. Trucks carrying cattle to market over long jumps are carrying these sets for a two-fold purpose. Most important, they permit the drivers to tune in and get the latest market quotations, so they will know what to expect for their cattle when they arrive at their destinations. Then, too, being able to tap the outside world, they keep awake at night. Back home, the boss tunes in on his set, notes the prices of cattle. When the hired men get back to the farm, the boss is able to check up on reports turned in and determine whether or not he has been gypped.

* * *

HOT off the griddle comes Graham-Paige's check-up on May registrations, and the findings are embodied in the report that "in Detroit Graham showed an increase of 137 per cent. over registrations, while the total registrations of all makes gained only 18 per cent. In Cleveland Graham's gain was 30 per cent. while the registrations of all other makes declined 16 per cent. In Philadelphia, where the total registrations dropped 2 per cent., Graham showed a gain of 32 per cent. Buffalo reports a gain of 107 per cent. for Graham and a falling off of 13 per cent. in the total registrations."

Col. Ayres Sees Business Prospects More Hopeful

(Continued from Page 1)

heavy industries and in the volume of new building. However this may prove, it is cheering to note that inventories of some kinds of goods, both in the hands of dealers and in the possession of the ultimate consumers, have at last fallen so low that mills and factories making them are once more increasing their activities."

The colonel points out that in all cases, except, perhaps, that of underwear, the recovery shown has now progressed so far as to make it fairly sure that it is not a mere temporary fluctuation. Production of these lines, he asserts, is clearly responding to replacement demand. Output is expanding because the goods consumers had when the depression came are wearing out, and now new ones are being purchased.

There was no very good reason for the most recent attack of the business blues, declares Col. Ayres emphatically.

"Three times, so far, the spirit of pessimism has been allowed briefly to dominate the judgment of the business community," he says, "and on each occasion it has been promptly displaced by saner counsel and more wholesome thinking.

"The first wave of unreasoning gloom came in November, 1929, when the illusions of the new era were swept down in wreckage by the collapse of stock prices. A return of the defeatiest spirit came last December, when the difficulties of banks and brokerage houses culminated. May marked the third plunge into melancholy. Three times ought to be enough. There was no very good reason for this latest attack. It is true that the slow advance in business activity, that had been under way since last January, came to a halt, but that is not sufficient excuse for discouragement, since the bottoms of all depressions are marked by periods of brief advances and recessions. No important failures occured and no new unsound spots in banking or industry were disclosed. Nevertheless security prices melted steadily away.

"It was not until the opening days of June that the long-awaited rally arrived and restored more nearly normal attitudes.

"Present prospects are clearly more hopeful than business sentiment was willing to admit a short time ago."

The Cleveland Trust Company's business activity index reached in January its low point of 28.3 per cent. below normal. It advanced to 25 in ebruary, to 23.4 Fin March and to 22.7 in April. Similar continuous advances throughout the summer are not to be expected, however, it is pointed out.

The cost of living still is declining. Col. Ayres recalls that in the depression of 1931 the cost of living continued to decline for more than a year after business activity had turned upward, with the recovery well under way.

Col. Ayres says symptoms of a slowing down in the rate of business recession have appeared in Canada and Italy, and slight upward movements are in evidence in the United Kingdom and in the United States. On the other hand, this year has brought even more rapid declines in business activity in Germany, France and Belgium.

"Probably an improvement of conditions in Germany would be the most helpful next development," says the Cleveland banker, "for in that event the state of trade would probably grow better in Germany, England and the United States simultaneously, and definite recovery might then get under way.

"Clearly it would not be safe to infer from the evidence presented that recovery in the United States is likely to precede improvements abroad, or, on the other hand, that it must await them."

Although construction work is slow, it promises to be the main support of the steel industry for some time to come, Col. Ayres believes. Steel plants making line pipe, structural steel and reinforcing bars, he says, are making the best earnings. Finished steel prices as measured by Iron Age's composite index, now are around $42 a ton, as compared with $40 in February, 1922, the low point in the last severe depression. For five months this year steel output is just short of nine and a half million tons, compared with more than fifteen and a third millions in the corresponding months of 1930, representing a decline of nearly 39 per cent. During May steel mill activity dropped from 47 per cent. of capacity to about 40 per cent., thirteen blast furnaces were blown out and five brought in, bringing producing furnaces down to 107, or 35 per cent., out of an available 307.

A study made by Col. Ayres of common stocks indicates that they now are "paying their board," or, when carried in a speculative account, return a dividend income greater than the carrying cost.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

M'DONALD INDORSES MOVE TO ROUTE U. S. ROADS AROUND CITIES

(Continued from Page 1)

lishing a system of rural roads, and the connections through cities have become the bottle-necks of the system.

"In the next few years a much larger portion of road fund expenditures will be made in municipalities. The greatest problem in highway administration today is the construction of adequate traffic facilities through metropolitan areas."

While indorsing the general principle of circumvention, Mr. McDonald added that detailed recommendations of the Association of State Highway Officials will await study by his staff in Washington before an exact plan is announced.

Mr. McDonald exhibited a chart showing the impetus to road-building activity and the relief of unemployment supplied by government aid. Up to June 1 a total of $172,000,000 in Federal aid had been obligated this year, as compared with $56,000,000 as of the same date last year and $31,00,000 in 1929.

300 IN CHRYSLER SALES FORCE TO GET SURPRISE

Newark, N. J., June 13.—The utmost secrecy is being maintained regarding the purpose of the dealer meeting to be held at the estate of Alfred De Cozen, at Parsippany, on the afternoon of June 19. Something like 300 Chrysler dealers, comprising the De Cozen dealer organization, including sales and service men, will gather.

Alfred De Cozen, president and general manager of the De Cozen Motor Company, promises a surprise. The real purpose of the affair concerns the Plymouth.

Besides the Chrysler dealers, factory representatives and members of the press will be present. A picnic is planned as part of the day's fun.

UPSTATE N. Y. RAILROAD GIVEN BUS LINE PERMIT

Johnstown, N. Y., June 13.—The Fonda, Johnstown & Gloversville Railroad Company has been authorized by the public service commission to establish and operate a motor bus line between Fonda and Fort Johnstown, N. Y. The commission did not consent to the discontinuance of any of the trolley service provided on any portion of the route of the railway company.

GENERAL MOTORS NET EARNINGS WILL COVER FIRST HALF DIVIDENDS

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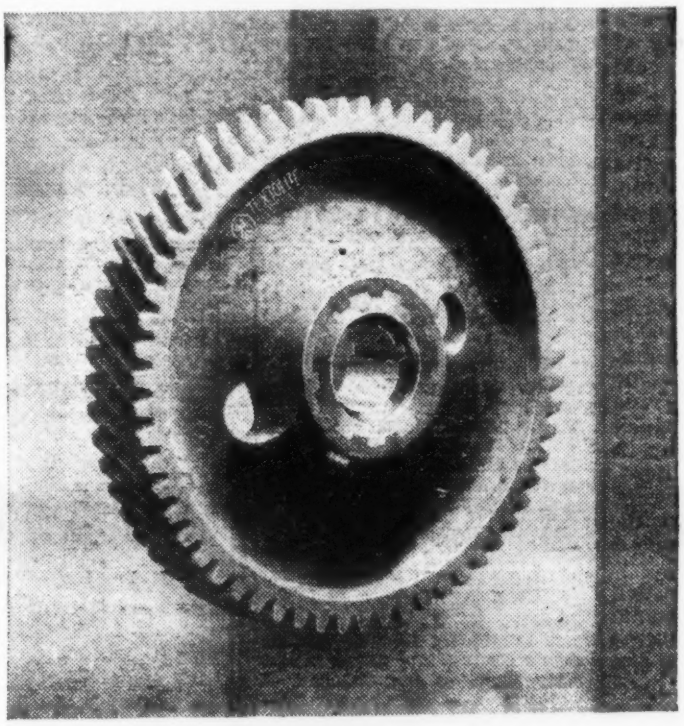
quirements of $1.50 for the period.

Net profits from operations in the first half of 1930 were $2.17 a share, while special income brought the total up to $2.32 a share. It has not been indicated whether 1931 will bring anything in the way of non-operating income.

Expectations of profits for the period equal to those of last year are based on dealer sales reports for April and May slightly higher than those for the 1930 months.

SPOKANE SALESMAN SELLS FIRM SEVEN FARGO BUSES

Spokane, Wash., June 13.—H. G. (Tommy) Thompson of Riegel Brothers' truck department, sold one of the largest orders for automotive transportation units ever placed locally by a dealer, when he sold seven Fargo buses for $50,000 to the Washington Water Power Company as the first of a fleet of buses that are expected eventually to replace all street cars.



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THE best design is the simplest. The fewer the parts, especially if moving, the greater the reliability, the less the wear.

The nonmetallic-gear timing drive consists simply of a gear on the camshaft meshing with another on the crankshaft—sometimes with a second on the auxiliary shaft. No simpler design is conceivable.

This simplicity of design combined with the extraordinary lightness, resilience, and wearing qualities of the nonmetallic gear results in precise, permanent timing at low cost.

TEXTOLITE TIMING GEARS

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GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

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ADVERTISING AND BUSINESS HEADQUARTERS

Harry A. Tarantous, Business Manager. 350 Hudson St., New York, N. Y.
George M. Slocum, Manager Detroit Bureau, 427-8 Fisher Building, Detroit, Mich., phone Empire 3500; Willard R. Cotton, Western Manager, 333 North Michigan Ave., Chicago, Ill., phone Central 5936; Metz B. Hayes, New England Manager, Little Building, Boston, Mass.; Blanchard, Nichols & Coleman, American National Bank Building, San Francisco, Cal.; Lincoln Building, Los Angeles, Cal.; 1037 Henry Building, Seattle, Wash. Address ALL advertising and business correspondence to 350 Hudson St., New York City.

EDITORIAL DEPARTMENT

350 Hudson St., New York, N. Y. Telephone CAnal 6-1000
Alexander Johnston, Editor. William C. Callahan, News Editor.
Statistical Department (registrations and specifications), P. J. Robas, statistician, C. J. Alexander, sales analyst. Engineering Department, A. Benson Carleton, technical editor; J. Russell Walsh, engineering editor. Merchandising Department, Charles S. Zack, editor. Art Department, John Bauersfeld, director.
Detroit Bureau, Chris Sinsabaugh, editor, 427-8 Fisher Building, Detroit, Mich. Telephone Empire 3500. Contributing editor, John C. Wetmore.

The Engineers Have Been Too Good

IT seems a bit discourteous to accuse such an amiable and efficient body of men as the engineering fraternity of complicity in producing the present depression, but cold facts bear out the accusation. There is little question that one of the factors in creating the present world-wide economic crisis is the all too great skill of our engineering fraternity in giving our production executives the tools and machinery to outstrip the efforts of our distribution machine.

In a speech delivered before the annual convention of the National Electric Light Association at Atlantic City, J. F. Owens, president of the Oklahoma Gas and Electric Company, remarked:

"I may be wrong, but it seems to me that no one is making any effort to get down to what I call the 'grass roots' of our difficulties. If this is done, we very quickly find that most of our problems, which seems to be the outcome of some intanible but nevertheless very real world-wide economic crisis, can be resolved into one very simple problem, which is not new, but which, for the moment, is all dressed up in new clothes, with no particular place to go, and which, therefore, is trying to go every place at once. It is the problem of distribution which, in this country at least, is becoming more and more acute, affecting not only every man, woman and child in the United States, but throughout the world.

"The acuteness of this problem of distribution is due very largely to the rapidity with which our whole economic structure has changed in the past few decades. The problems of production created by this highly-developed machine age have been solved to some extent, very largely because American industry has its five-year, ten-year and even fifteen-year programs. On the other hand, we apparently have not yet learned how to control the consequences of our machinery and our mass production—we produce the highest quality of commodities at the lowest possible unit cost and in quantities sufficient for every one, but we just don't seem to know how to get them to the consumers in such a way that they, too, may benefit by the machine age. Hence, we are startled by this overnight growth of the problem of distribution."

No student of industry will deny that the development of our production system, the "mass production" about which we hear so much, has been made possible by the genius of engineers, designers and inventors, who have conceived and executed the labor-saving equipment that makes our factories supreme. Analysis shows that our engineers and production men have proceeded so fast that the sales and distribution executives have not been able to keep pace with them. It is just a case of one branch of industry being too good for another.

It remains now for our economic experts to bring our distribution machinery up to a level with engineering and production.

WHATEVER the economic effect, the entrance of the big oil companies into the lubrication service station field has certainly had a pleasant effect on the courtesy to be found at those necessary stopping points. The men in charge of these wayside stations seem to have been well trained; they appear to have learned the vital lesson that courtesy is the fundamental compeller of repeat business.

The system varies with different companies. In one chain of filling stations, as soon as the motorist drives up, boys in neat uniforms come up and one of them cleans the windshield, while another examines the oil and courteously reports to the driver that it is "all right" or "another quart wouldn't hurt." Invariably the question is asked: "Shall I fill up the gasoline tank?" If the answer is, "No, just let me have five gallons," it is accepted without comment and the required amount of fuel goes into the reservoir. Nevertheless, the courteous, "Shall I fill it up?" probably adds a considerable amount to the season's total sales.

ADDITIONAL S. A. E. DELEGATES REGISTER AT SUMMER MEETING

(Continued from Page 1)

Machine; David Beecroft, Eclipse Machine.

John Mahoney, Bendix Brake; R. M. Heinrichs, Bendix Westinghouse; M. E. Chandler, Bendix Stromberg; Raymond Lansing, Bendix Research; Commander C. H. Havill, Bendix Research; Lieut. Z. Soucek, Eclipse Aviation; Frank Mock, Bendix Research; Otto Lang, Hydraulic Brake; Frank B. Wills, Bragg Kliesrath; H. A. Hansen, Bendix Stromberg; D. L. Gallup, Bendix Brake; Col. Clarence M. Young, secretary Bureau of Aeronautics, Department of Commerce.

DELEGATES TO S. A. E. SUMMER MEETING SEE LIVELY SESSION AHEAD

(Continued from Page 1)

nothing of wives and friends, there being no sarcasm intended in the coupling of those two latter terms.

Other S. A. E. executives who are already on hand and ready for the big doing are C. B. Veal and R. S. Burnet. A. J. Underwood is here, completing arrangements for publishing the Daily S. A. E., which will be done this year by the Budd organization, assisted by members of the staff of Young and Rubicam.

TRUCK INTERESTS FACE SERIOUS RESTRICTIONS IN ILLINOIS LEGISLATION

(Continued from Page 1)

and load shall not exceed 40,000 pounds.

The legislation further covers the matter of tires, by providing that all motor vehicles must have rubber tires of at least ¾-inch thickness, and that all vehicles carrying more than seven persons, shall be equipped with pneumatic tires.

BETHLEHEM STEEL FILMS SHOWN TO FOREMEN'S CLUB

Newark, N. J., June 13.—The Foremen's Safety Club of Newark held its last meeting of the season Friday night in the Chamber of Commerce assembly room. The speaker was George A. Richardson, technical lecturer of the Bethlehem Steel Company, who exhibited films depicting operations in the production of steel.

COMING EVENTS

JUNE

14-19—**White Sulphur Springs, W. Va.** Society of Automotive Engineers, summer meeting.
15-18—**Madison, Wis.** American Society of Mechanical Engineers, fourth national oil and gas power meeting.
17-19—**French Lick, Ind.** Steel Founders Society, mid-summer meeting.
21—**Montlery Track, France.** Automobile Club of France, grand prize race.
22-26—**Chicago, Ill.** American Society for Testing Materials, thirty-fourth annual meeting.
22-27—**Boston, Mass.** National Association of Credit Men, convention.
29-30—**Chicago, Ill.** National Association of Taxicab Owners, meeting.

JULY

4—**Altoona, Pa.** Automobile race.
19—**Nurburg-Ring, Rhineland, Germany.** Automobile Club of Germany, grand prize race

SEPTEMBER

1- 3—**Cleveland, O.** Hotel Statler, Society of Automotive Engineers, twentieth annual aeronautical meeting in conjunction with National Air races.
8-17—**Utrecht, Holland.** Utrecht Fair, bus and truck show.
16-17—**Atlantic City, N. J.** National Petroleum Association, annual meeting, Hotel Traymore.
20-26—**Springfield, Mass.** Eastern States Exposition.
21-25—**Boston, Mass.** American Welding Society, meeting.
28-29—**Atlantic City, N. J.** National Association of Motor Bus Operators, fifth annual meeting, Hotel Ambassador.
26-Oct. 2—**Atlantic City, N. J.** American Electric Railway Association, annual meeting.

OCTOBER

1-11—**Paris, France.** International Automobile Salon.
2- 3—**Houston, Tex.** American Institute of Mining and Metallurgical Engineers, petroleum division meeting
12-16—**Chicago, Ill.** National Safety Council.
14-16—**Pittsburgh, Pa.** Society of Industrial Engineers, convention.
15-24—**London, England.** International Motor Exhibition, Olympia Hall.
22-28—**Prague, Czecho-Slovakia.** International Automobile Exposition.

Complete Technical Program Of S. A. E. Meeting

(Continued from Page 2)

10.00 A. M. Ballroom

STANDARDS
Arthur Boor, Chairman
Reports of the various divisions will be presented and acted upon
2.00 P. M. **Field Day**
8.30 P. M. Auditorium

SEMI-ANNUAL BUSINESS MEETING
President Vincent Bendix in the Chair

AIRCRAFT
Dr. G. W. Lewis, Chairman
Flying With the Navy—Hon. D. S. Ingalls, assistant secretary of the navy for aeronautics

THURSDAY, JUNE 18

10.00 A. M. Auditorium

AIRCRAFT ENGINES
Arthur Nutt, Chairman
Air-Cooled Cylinder Head Design—Roland Chilton, Wright Aeronautical Corporation
Recent Valve Developments—A. T. Colwell, Thompson Products, Inc.
10.00 A. M. Ballroom

CHASSIS
E. S. Marks, Chairman
The Tire Factor in Automobile Riding Quality—R. W. Brown, Firestone Tire and Rubber Company
Road Tiests With the New Wabblemeter—Dr. F. A. Moss, George Washington University
Some Observations on Riding Qualities—Dr. Ammon Swope and Prof. H. M. Jacklin, Purdue University
Instrumentation as a Means for Co-ordinating Chassis and Body Design—A. F. Denham, Automotive Industries
2.00 P. M. **Aviation Demonstrations**
8.30 P. M. Auditorium

GENERAL PRODUCTION SESSION
E. K. Wennerlund, Chairman
Cost to Industry of Labor Turnover—H. L. Horning, Waukesha Motor Co.
10.30 P. M. **Grand Ball** Ballroom

FRIDAY, JUNE 19

10.00 A. M. Auditorium

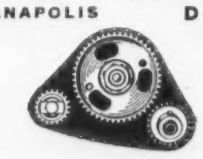
ENGINES
G. C. Brown, Chairman
Oil Control in the Engine—H. C. Mougey, General Motors Corporation
Winter Starting Tests—P. J. Kent, Chrysler Corporation.
Reduction of Fan Noise and Fan Power—A. D. Gardner, Automotive Fan and Bearing Company.

A PERFECT TIME is the wish of Link-Belt to all attending the S. A. E. Summer Meeting.

• • • • •

Incidentally, we also point out that there is PERFECT TIMING of the auto engine when the Link-Belt Drive is used.

LINK-BELT COMPANY
INDIANAPOLIS DETROIT



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AUTOMOTIVE SILENT CHAIN

• TWO ROOMS, FOUR ROOMS, A HOUSE— AND A CAR!

AND so they were married—some sixty thousand of them in New York City last year . . . and lived more or less happily in the smallest apartment they could find. Then he made a little more money and they moved into a larger apartment. And along about this time the Little Stranger puts in an appearance—one hundred and twenty-five thousand per year! That means a house somewhere, usually in Brooklyn or Queens or the suburbs. And with the house comes a car. Like ham and eggs they go together. Perhaps they don't buy the car right away, but have to wait a year or two until the new furniture is bought or the second mortgage cut down . . . . but they find they do need the car. And so the market grows in New York.

This is house-hunting time, house-buying season, and the moving months. A hundred thousand or so families here *make themselves* new customers for transportation every year. And the cars they know are the cars they buy!

Since The News reaches two out of three families in New York City, its readers include a majority of those who move and buy houses as well as those who stay put. News two-thirds coverage also includes more young people, new families, than any other publication in New York. And News suburban circulation, reaching one in five families in the New York suburbs, includes the largest coverage of the market there as well.

So you would do well to use News space generously at this time of the year—to reach most of the most active prospects in this market. You would do well using The News at any time of the year—if you really want your advertising seen and read. The small News page does get to more eyes and more minds. And the low News cost brings you more advertising for every dollar spent than any other medium you can use in this market.

To sell more cars in a market hard to sell in a hard selling year, think seriously about this advertising medium!

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NEW YORK'S PICTURE NEWSPAPER
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Tribune Tower, Chicago + Kohl Bldg., San Francisco

Diagnoses Conditions Which Affect Vapor Lock

Study of Relation of Various Phases of Vapor Lock Problem Indicates That Fuel Line Temperatures May Be Reduced by Simple Design Changes

By O. C. BRIDGEMAN AND H. S. WHITE
Bureau of Standards, Washington, D. C.

The following is a paper to be presented today before the summer meeting of the Society of Automotive Engineers, held at White Sulphur Springs, W. Va.:

Boiling of gasoline in the fuel feed system may cause interruption of fuel flow with resultant engine stoppage. This phenomenon is known as vapor lock and its occurrence is a source of considerable annoyance to the motorist, for it is usually necessary to wait until the fuel line has cooled off before the engine can be started again. The higher the vapor pressure of the gasoline, the lower is the temperature at which boiling commences. Thus vapor pressure is the property of a gasoline which determines the boiling temperatture and hence the vapor-locking tendency In any given automobile operated under any chosen set of conditions, the fuel with the lowest vapor pressure can stand the greatest amount of heating before vapor lock occurs. On the other hand, a gasoline which is satisfactory in one automobile may give trouble in another automobile due to difference in design of the fuel feed systems and thus in the amount of heat imparted to the gasoline while flowing through the feed system. Similarly a gasoline which is satisfactory in cool weather may give trouble from vapor lock in warm weather. Altitude likewise has an effect, for in elevated regions, the temperature at which boiling occurs is lower than at sea level.

Accordingly, the four factors which affect vapor lock are vapor pressure of the gasoline, design of fuel feed system, atmospheric temperature and altitude. Whereas, vapor pressure determines the temperatures at which boiling will occur at any given altitude, the atmospheric conditions and the design of fuel feed system determine whether the gasoline will be heated to its boiling temperature in service. Of the above four factors, the two which can be controlled or modified are gasoline vapor pressure and fuel system design. In general, the refiner is controlling gasoline vapor pressure according to the atmospheric temperature and the type of equipment in which the fuel is to be used, and probably this control will always be necessary. By reducing the vapor pressure to a low value, vapor lock can be almost entirely eliminated in very hot weather, even with the present day design of fuel feed systems, but such control of vapor pressure materially reduces the percentage of suitable gasoline available. During the spring and fall, however, vapor lock cannot be eliminated entirely in current automobiles, since a compromise is necessary between vapor pressure and ease of engine starting, due to the variability of weather conditions. The refiner can go part way by minimizing the propane content of the gasoline, but this is not all that is necessary. The automobile manufacturer should equip cars with cooler fuel feed systems, and a few simple changes in design will produce many degrees lowering in fuel temperature. When temperatures in fuel feed systems are only a few degrees above atmospheric temperature, and when gasolines are free from propane, material increases in vapor pressure can be made even in very hot weather and still insure complete freedom from vapor lock. Some car manufacturers have taken steps to redesign fuel systems and others will unquestionably follow shortly, but vapor lock will still be a problem to the refiner, until the majority of the cars on the road today have been replaced or redesigned.

The general conclusions outlined are based on the work which the Bureau of Standards has been doing on the vapor lock problem during the past two years under the auspices of the Co-operative Fuel Research Steering Committee.

Gasoline Vapor Pressure

Since vapor lock is a result of boiling of the gasoline in the fuel feed system, the first step in the general investigation was the determination of the method of measuring of vapor pressure which would give results significant as regards vapor lock. Due to the fact that gasoline is a complex mixture of hydrocarbons and that it normally contains dissolved gases, the magnitude of the measured vapor pressure will depend to a large extent upon the method of measurement. A preliminary investigation of the solubility of gases in gasolines indicated that the amounts of dissolved gases (exclusive of propane) normally present were too small to cause trouble from vapor lock in a reasonably well-designed fuel system. Accordingly, a method was devised for preparing gas-free samples of gasolines and for measuring the true vapor pressure of these gas-free gasolines over a range of temperature. Data were obtained on forty-two diverse gasolines, and included the effect of addition of benzol up to 40 per cent., of butane up to 20 per cent. and of propane up to 5 per cent. Information was also obtained on the variation in vapor pressure with increase in the amount of vapor formed, since fuel systems vary somewhat in their capacity for handling vapor.

The precision method developed at the Bureau of Standards for the determination of gas-free vapor pressure is not suitable for routine work, but it has a distinct advantage in its possiblities as a standard method for comparing the accuracy of more practical methods. An extensive comparison with three such methods was made.

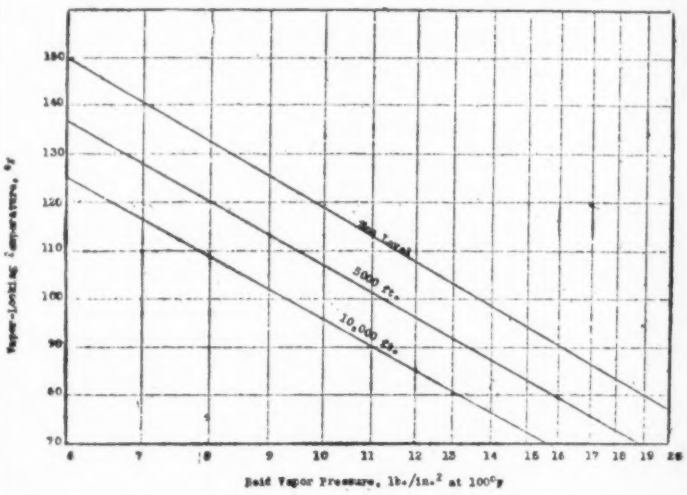

FIG. I. Relation between Reid vapor pressure and vapor-locking temperature at various altitudes

1. The temperature on the A. S. T. M. distillation curve at 10 per cent. evaporated was found to be equal to the normal bubble point, or the temperature of boiling at sea level atmospheric pressure for propane-free gasoline having conventional distillation curves. For gasolines containing propane, the boiling temperature is lower than the 10 per cent. point. Each per cent. of propane of volume increases the vapor pressure by 2.2 pound / in². at 100 degrees F., and lowers the boiling temperature about 15 degrees F. for an eight to ten pound / in². gasoline, whereas there is a much smaller effect on the 10 per cent. point. Hence, the 10 per cent. point represents essentially the maximum fuel temperature in the feed system without encountering vapor lock, while trouble may be encountered at lower temperatures, due to the presence of propane.

2. The temperature of the liquid at the initial boiling point in the A. S. T. M. distillation was found to be equal to the normal bubble point. This method is inaccurate, however, due to the difficulties of obtaining precise temperature measurements on account of superheating of the gasoline.

3. Vapor pressures by the Reid method at 90 degrees F. or 100 degrees F. on all types of fuels investigated showed satisfactory agreement with the gas-free values when the former were multiplied by the factor 1.1 to correct for the larger volume of vapor space employed in the Reid method. This method therefore serves as a general practical means of obtaining the boiling temperature of the fuel.

The relation between the Reid vapor pressure PR at 100 F. and the vapor locking temperature at t at sea level atmospheric pressure can be expressed as follows:

$$t = 259 - 140 \log PR \qquad (1)$$

where the vapor pressure is expressed in pounds/inches² and the temperature in degrees Fahrenheit. Equation (1) assumes an average slope of the vapor pressure temperature curve and a volume of vapor equal to that of the liquid before vapor lock occurs in the fuel feed system.

Graphical representation of the relation between Reid vapor pressure and vapor locking temperature is shown in Fig. 1. This chart also incorporates the effect of altitude on vapor-locking temperature, there being one line each for sea level, 5,000 feet and 10,000 feet altitude. The vapor-locking temperature at 5,000 feet is about 12 degrees Fahrenheit lower and at 10,000 feet about 24 degrees Fahrenheit lower than at sea level.

Equation (1) has been checked directly or indirectly in the case of a larger number of fuels in labora-

(Continued on Page 8)

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The greatest assistance you can give a sales manager today is something on the car or truck that can be shown to increase the life of the vehicle and at the same time cause less mechanical trouble and freedom from frequent attention. The

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IN ALL MOTOR CARS

Common Sense decreed four-wheel brakes for safety—created bumpers for protection—devised traffic signals as a safeguard.

Common Sense demands the elimination of the greatest remaining danger in motoring—the ever present, *now avoidable* horror of splintered, flying glass.

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LIBBEY·OWENS·FORD SAFETY GLASS

Relates Motor Truck Uses In Public Utility Field

Importance of Records Stressed; Efficient and Economical Use of Trucks Dependent on Good Dispatching; Operation in Several Centers Described

By DOL A. SMITH

General Manager Department of Street Railways, City of Detroit

The following, in part, is a paper to be presented today at the summer meeting of the Society of Automotive Engineers, White Sulphur Springs, W. Va.:

It is the purpose of this paper to treat the motor truck as a work unit, and to measure its utility by the amount of work performed; also to deal with the motor truck more as a transport unit than as a portable power unit, though its use in this manner will be touched upon.

The scope of the paper will be to cover the utilization of motor trucks in the public utility field as it applies to our subsidiary or associated companies, which comprise some 200 electric, gas, ice, water, coal, railway and bus enterprises.

It has been company policy for some years to keep records on the operation of motor trucks. A comparison of the operating cost for the last two years is as follows:

	Year 1930	Year 1929
No. of trucks..	3,065	2,608
Miles	28,040,796	23,697,635
Cost	$2,219,287.50	$2,108,617.65

It will be noticed that there was an increase of 18.2 per cent. in the number of motor trucks, and an increase of 18.5 per cent. in the number of miles that these trucks were operated, with a corresponding increase in cost of only 5 per cent. So it is only logical to assume that there is improvement in the operating efficiency of this fleet. This amount of money is in itself a measure of the performance and importance of motor trucks in the various enterprises, but it further demonstrates the importance of improving utilization of motor trucks so as to do more work for the same or a lesser amount of money. For the last four years there has been a decrease in the cost per mile and the cost per ton mile of motor trucks in this fleet, while the mileage per truck has increased each year over the preceding year. As mileage on motor trucks is regarded by many as a measure of performance, the fleet's capacity for work has been increased.

The first step necessary in the utilization of motor trucks is the keeping of records that will serve in some manner as a measure of performance. If these records are to be made comparable, it will be found desirable to decide on some unit, such as the cost per mile, the cost per ton mile, the cost per truck, or the cost per day as a basis of comparison. On trucks we use the cost per mile and the cost per ton mile, and twice each year all companies are sent comparative costs that place them on a competitive basis for the motor trucks that are operated by each company. This semi-yearly report is a means of presenting standards of performance, and each company is encouraged to become the standard bearer. Companies do not seem content to be just average companies, but there is a genuine desire to lead. These records start with a daily or semi-monthly truck report for each truck which is made up generally by the local office in each town, then forwarded to the division office, which is purely supervisory; from there to the general office of the company, where it is compiled into one report and then forwarded to Chicago. Each company's general office encourages division competition within the company by sending back each month a summary of operating costs by divisions. It seems necessary to us to keep records of operating costs if other principles of efficient operation are to be applied.

The key to efficient and economical use of motor trucks is to be found in good dispatching. This means a high standard of service, with routing and scheduling so as to send trucks to the places needed at the time required. It means maintaining a maximum load factor on all equipment, which, of course, calls for a minimum investment in equipment. In a broad sense, dispatching includes the assignment of all equipment to the various transportation tasks which make up the day's work. Each motor truck is assigned by the transportation department of a company in one of the following ways:

1. It is assigned permanently to a particular company division and is then available only for the transportation work of that division, which may be a single employee or a department.

2. It is placed at the disposal of a central dispatcher, to whom all requests for transportation come, and who fulfills requirements as they arise from the "pooled" equipment at his disposal.

An example of the first case is the Central Illinois Public Service Company, operating in central and southern Illinois, in about one-third of the state's area. The company maintains a fleet of 463 motor trucks. All the trucks and trailers used in line work and transportation of supplies are provided with the latest type of equipment, resulting in the efficient and speedy handling of work.

The year 1930 witnessed the completion of the last of the series of divisional garages, thus making an improvement in garage facilities. Under this new arrangement, each division repairs, equips, mans and operates its own fleet, resulting in a faster and more efficient service. Cost, per mile, in 1930 was reduced 13 per cent., and cost, per ton mile, was reduced 10 per cent. from that of 1929. The company has six divisional offices, each of which is supervisory, and though local offices are assigned many of the motor trucks, responsibility for efficient operation rests with the division office, which is in turn responsible to the general office.

This company operates twenty-nine ice plants, located in strategic positions in central and southern Illinois. Delivery expense per ton in 1930 was reduced 14 per cent., as compared with 1929, largely by utilization of motor trucks instead of horses, and supplying motor trucks with front opening bodies that conserve the energy of the drivers.

Routing of ice trucks is next in importance, and can best be analyzed by considering the 300-day winter routes as base routes and expanding these into 200-day spring and fall routes and 100-day summer routes. Expanding the winter routes is possible with trucks, and allows supervision by the full-time employee over the summertime employee. The use of trucks in the delivery of ice also allows the number of routes to be increased or decreased each day of the week, according to the demands of that day, rather than on an estimate of the existing demands of the previous day. This is reflected directly in the complete elimination of helpers on delivery trucks, which is a most important economy. Drivers and motor rtucks are dispatched by delivery superintendents, or in small towns or communities by the local managers. No hired or "peddler" delivery is used.

The utilization of motor trucks in ice delivery promotes increased revenue per route, which in turn makes possible incentive wages, increased wages, Christmas bonus and higher type of ice delivery salesmen. Improved service and the reduced delivery expense, with improved operating efficiencies, permitted this company to reduce ice prices, with a saving to its customers of approximately $10,000 annually.

An example of both cases of dispatching occurs in the City Ice Company of Kansas City, which operates 18 ice plants and serves a city of 500,000 population with ice and coal. This company operates 212 trucks on routes and 27 trucks for car icing and hauling ice between plants and storage stations. All trucks are assigned to routes by the transportation department, and the fleet of transfer and car icing trucks is directly under a central dispatcher. At times the transfer trucks work entirely at night, and again these work continuously, night and day. Relay and transfer trucks were in times past assigned to various plants and districts, but economy has been effected by centralizing control of this equipment in the transportation department.

A considerable quantity of ice is delivered during the summer months for this company by the contract ice delivery man, or what is commonly termed the "peddler." The extent of use of this type of delivery rests entirely with the general delivery superintendent and the district superintendent. The economy of this type of delivery is

(Continued on Page 10)

TORREY, PRALICH AND SIMMONS
GEOLOGISTS AND PETROLEUM ENGINEERS
BRADFORD, PENNSYLVANIA

December 19, 1930.

The Visco-meter Co.
315 Grote Street,
Buffalo, New York.

Gentlemen:

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I am thoroughly convinced that the Visco-meter represents a notable advance in the efficient lubrication of internal combustion engines. It will do more to impress upon the minds of the motoring public the value of using quality oils, than any amount of newspaper and magazine advertising. The Visco-meter makes one oil-conscious and I feel certain that it will be welcomed by automobile manufacturers as a most effective means of reducing the rapid depreciation of motors from the use of inferior oils.

Yours very truly,

Paul D. Torrey

Paul D. Torrey:HN

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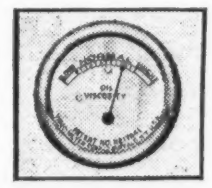

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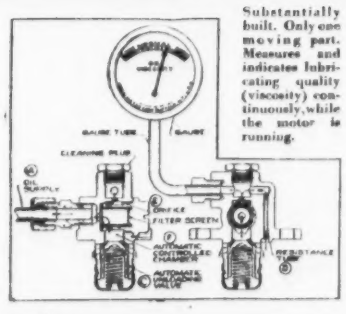

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Fuel Line Temperatures in 1931 Cars

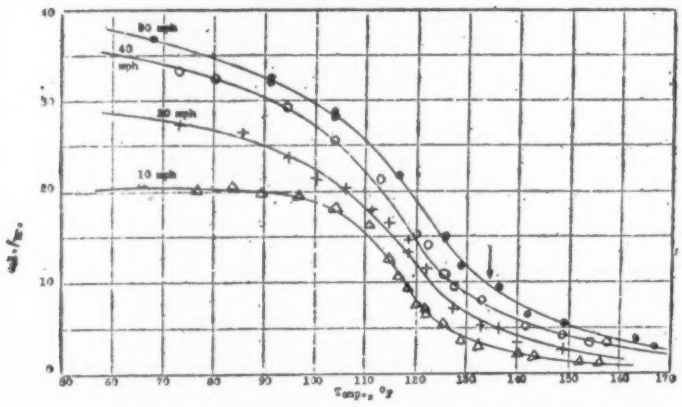


FIG. 2. Typical temperature-flow diagram for automobile fuel pump

(Continued from Page 6)

tory fuel feed systems and parts of such systems, and was observed to hold closely. With automobile fuel pumps, it has been found that there is some flow after the vapor-locking temperature is reached. A typical temperature-flow diagram is shown in Fig. 2, where the arrow represents the vapor-locking temperature. The four curves represent maximum pump capacity at pump speeds corresponding to car speeds of approximately 80, 40, 20 and 10 m. p. h. for an average car. At a car speed of 40 m. p. h., the pump could deliver about 7 gallons per hour at the vapor-locking temperature and at 10 m. p. h. about 3 gallons per hour. These are sufficient to enable the engine in an average car to run smoothly, but engine stoppage would occur in most cars if the fuel were heated much above this temperature, for not only does the flow decrease, but it becomes irregular due to intermittent passage of liquid and vapor. In these experiments, the temperatures were measured at the fuel pump inlet and there was little temperature gradient across the pump. In an actual fuel system there is an average temperature increase of about 10 degrees F. across the pump. Hence vapor lock might be expected to occur in the pump when the temperature of the fuel entering the pump reaches the vapor-locking temperature.

Fuel Line Temperatures

The relation between the Reid vapor pressure and the vapor-locking temperature expressed in equation (1), modified if necessary for altitude, gives the predicted conditions for vapor lock with any fuel. This makes it possible for the refiner to control the vapor pressure of his commercial product if he knows the temperatures which the fuel is likely to reach in service. However, very little information has been available on the fuel temperatures in automotive equipment. Accordingly during the summer of 1930, a survey of automobile fuel line temperatures was made by the bureau and several co-operating laboratories. The data obtained proved of sufficient interest to warrant a second survey on 1931 cars.

The points at which temperature data were obtained in the automobile fuel systems were as follows:

1. Vacuum Tank Systems—Fuel tank outlet, vacuum tank inlet, vacuum tank outlet, carburetor inlet and carburetor bowl in some instances.

2. Fuel Pump Systems—Fuel tank outlet, fuel pump inlet, fuel pump outlet, carburetor inlet and carburetor bowl in some instances.

3. Gravity Feed Systems—Fuel tank outlet, sediment bowl outlet and carburetor inlet.

In every run the outside air temperature was recorded.

Constant speed runs at various speeds from 20 to 40 m. p. h. were made. Each constant speed run was of such duration that the temperature at each point reached a maximum and remained constant. A 40-mile run was found to be sufficient in all cases, while in some of the runs a shorter distance was sufficient. At the completion of each run the car was drawn over to the side of the road and measurements made while the engine was idling with the gears in neutral. The idling period was of such duration that the temperature at each point reached a maximum and then dropped. In many of the tests the car was run over the same course in both directions to study the effect of wind velocity and direction.

With about half of the cars in the 1930 survey, a run up a six-mile hill was made at the maximum speed permitted by the steepness and by the curvature of the turns, which was about thirty to forty miles per hour. The temperatures were recorded at stated intervals during the climb and the maximum values while idling in neutral at the top of the hill were noted. Hill-climbing tests were not made in the 1931 survey, since the information obtained in 1930 indicated that the temperatures attained during the climb were approximately the same as those attained on idling after the forty miles per hour run.

The method adopted in recording the experimental data is illustrated in Fig. 3 for car K. The solid lines represent the maximum temperatures reached under the designated test conditions and the dotted lines represent the maximum temperatures reached during idling in neutral after each test run. In order to make possible a more legitimate comparison between the data on different cars, and on the same car when run on different days, the increases in fuel temperatures at each point above that of the atmosphere were evaluated.

(Since the 1931 survey is not yet completed, the remainder of the paper has been written, for purposes of discussion, on the basis of the data obtained in the 1930 survey. To date, there is no evidence that any of the conclusions will be materially changed, due partially to the fact that the data obtained in 1930 were not available to the car manufacturers in time to incorporate changes in the 1931 cars.)

TABLE 1

Description of Test Cars in 1930 Survey

Car	Year	Fuel System	No. of Cyls.
A	1928	Pressure	6
A1	1929	Pressure	6
B	1929	Pressure	6
B1	1929	Pressure	6
C	1929	Vacuum	6
D	1929	Pressure	8
E	1929	Pressure	6
E1	1930	Pressure	6
F	1929	Vacuum	6
G	1930	Gravity	4
H	1930	Pressure	8
I	1930	Pressure	8
J	1930	Pressure	8
K	1930	Pressure	8
L	1930	Vacuum	8
M	1930	Pressure	4
M1	1931	Pressure	4
M2	1931	Pressure	4
N	1931	Pressure	6
N1	1931	Pressure	6
O	1931	Pressure	6
P	1931	Pressure	8
Q	1931	Pressure	8
R	1931	Pressure	6
R1	1931	Pressure	6
S	1931	Pressure	8
T	1931	Pressure	8

A description of the twenty-seven cars run in the 1930 survey is given in Table 1 and a summary of the data is given in Table 2 for temperatures at the fuel tank outlet, the fuel pump or vacuum tank inlet, the fuel pump or vacuum tank outlet and the carburetor inlet or bowl. All fuel temperatures are recorded as increases above atmospheric temperature. The temperature increments at 40 m. p. h., on idling after the 40 m. p. h. run, and during the climb up the six-mile mountain are listed in each group. The last column in the table indicates the average atmospheric tem-

(Continued on Page 10)

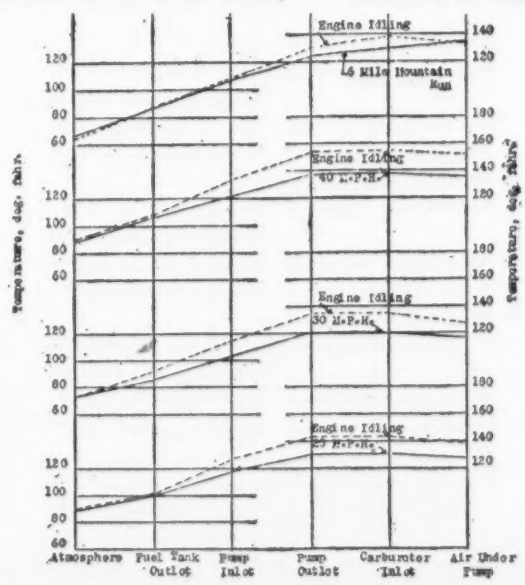
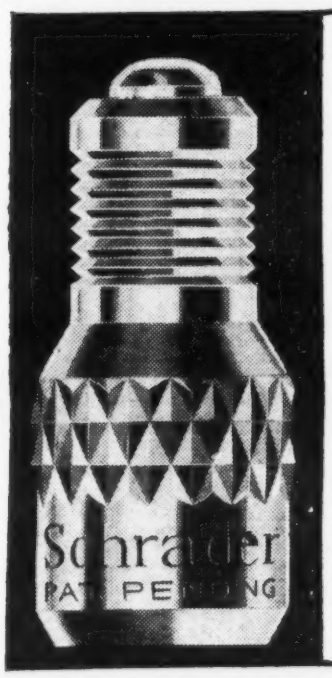


FIG. 3. Experimental data from tests on car K

The New Schrader DUBLCHEK VALVE CAP



Inflate Test Pressure Through The Valve Cap

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TIRE VALVES **TIRE GAUGES**

CHEVROLET DEALERS OF DETROIT ELECT STRENG LEADER OF ASSOCIATION

Detroit, June 13.—A. B. Streng of the Streng Chevrolet Company was elected president of the Detroit Chevrolet Dealers' Association at the annual outing and election, attended by sixty-five members and their guests.

Other officers elected to serve during the ensuing twelve months are: Vice-president, James R. Collins of the Collins Chevrolet Company, and secretary and treasurer, T. A. Peters of the Gratiot Chevrolet Company. H. H. Batcheller, who has served as general manager of the association since January 1, continues in that capacity.

The outing was held at the Gowanie Golf and Country Club, at Mount Clemens. A golf tournament was held in the afternoon and a banquet in the evening, at which a new board of directors as well as new officers were elected. Presentations were made to retiring officers.

R. C. Watson, city sales manager for Chevrolet; other zone officials and a representative of the secretary of state's office were numbered among the guests. Batcheller and Collins had charge of arrangements.

HEAD OF A. F. L. TALKS AT ECONOMIC CONFERENCE

New Brunswick, N. J., June 13.—Declaring that unemployment is the most vital and acute problem of the nation today, William Green, president of the American Federation of Labor, told delegates to the unemployment and economic conference held at Rutgers University here that the primary need of the country is to develop and encourage the buying power of all classes of people. There are more than 6,000,000 people unemployed in this country, who with their dependents number approximately 25,000,000, declared the labor president. He asserted that the purchasing power of these people has been destroyed by unemployment.

Curtailment of buying power is also affecting those people who are at present employed, according to Mr. Green. He said that this class feels they are menaced through demands from various sources that reduction in wages be made, or through discharge or enforced part-time employment. This reflects an unfavorable psychological condition, a lowering of buying morale and conservation of buying which is operating most injuriously.

WILLYS-OVERLAND SALES ON COAST UP IN MAY

Los Angeles, June 13.—Willys-Overland business in the Pacific Coast territory and particularly in Los Angeles and vicinity took a sharp upward turn during the month of May, according to a report made by G. V. Orr, vice-president of the Willys-Overland Pacific Company, factory and marketing organization of the parent company.

For the first time in more than a year, Orr said, the factory in Los Angeles has been compelled to work overtime during a part of last month to catch up with orders. May, he said, was the best month from the standpoint of sales and production the factory has had in the last thirteen months.

At the beginning of June the list of unfilled orders was considerably larger than usual and there was every indication that the month would be a busy one, Orr said.

51 GENERAL MOTORS CABS FOR INDIANAPOLIS SERVICE

Indianapolis, Ind., June 13.—Fifty-one new taxicabs from the General Motors Truck Company plants have been placed in service here, replacing a fleet of smaller cars used in cab service on the Lincoln line for the last two years. The new cabs, operating under the name of Terminal Cab Lines, are owned by the Yellow Cab Company, headed by Mike Moroney, a pioneer in the taxi business here.

Uses and Requirements of Motor Coaches Discussed

Flexibility Has Proved Motor Coach Advantages as Adjunct to Street Railway Operation; Standardization Desirable; Unit Design Improvements Suggested

By A. H. GOSSARD
Middle West Utilities Company

The following, in part, is a paper to be presented today before the summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

The electric railway industry has, in the last few years, accepted and has done much to introduce the motor coach, which now represents an investment running into many millions of dollars.

Perhaps one of the most important factors in determining the most suitable type of vehicle is the localized condition under which the vehicle is to be operated. In fact, since the very inception of the motor coach in the field of transportation, the demand for a vehicle to provide specific services under varying topographical and climatic conditions has severely taxed the research and designing staffs of both the manufacturer and the carrier. However, my intention is not to deal with every phase in the utilization of the motor coach, but to confine my discussion to the vehicle as it applies to urban transportation.

We believe that the motor coach has, and will continue to have, a very definite place in the scheme of city transportation and, with the exception of a few main trunk lines in some of the larger cities, I firmly believe that it has proved its greatest usefulness to the street railway industry in making it possible to provide transportation in the territories between and beyond the existing car lines, where service had become a paramount necessity but could not be provided from a trolley-car standpoint, because of the high cost of ways, overhead and feeder construction, without the acceptance of a most definite operating loss. The motor coach, being a flexible unit, may be routed into districts that are void of adequate transportation, thus serving new territories very easily by extending or changing the routes.

Much of this pioneering was done with small coaches seating in the neighborhood of twenty-one passengers, and to this day the twenty-one passenger coach is entirely satisfactory for light feeder and shuttle service and on short extensions and into thinly populated territory and outlying districts. Some of these lines developed very rapidly and soon reached a point in patronage where it appeared that service could be expedited and made more attractive and profitable by using coaches of a larger seating capacity. The industry had tried the twenty-nine, thirty-three thirty-seven and forty-passenger single deck and some sixty-passenger double deck vehicles over a period of five years before the economy of standardization in motor coach size became vitally apparent.

While many properties, including the one with which I am associated, are at present still operating motor coaches of various sizes, we are reasonably sure that most operators and manufacturers now recognize the desirability of standardization and are of the opinion that the twenty-one to twenty-three and the forty to forty-three passenger single deck vehicle is the size best suited for city transportation.

Briefly, the small twenty-one to twenty-three passenger vehicle has a definite usage in giving service in small cities and to outlying districts or sparsely settled territories in our larger cities, where the quantity of service is not so essential but maximum frequency of service is necessary at the minimum cost per mile. This size of motor coach is also very desirable in large cities that do not have other forms, or sufficient other forms, of rapid transit, and can be used very advantageously to provide a parlor-type seat-per-passenger unit in the field of selective service.

However, on main trunk lines and lines where the population is pyramiding or wherever extreme peak loads are encountered, and more particularly on lines where the motor coach has supplanted street cars, the single-deck circulating load street car type coach, seating forty to forty-three passengers, is entirely justified because it has been conclusively proved that the operating cost per mile is but 50 per cent. more than for the twenty-one passenger coach, giving twice the seating capacity and room for three to four times as many standees as the twenty-one passenger unit.

Trolley Coach Advantages

Engineers of both the automotive and the electrical industry have, through their combined efforts, given to the street-car business a vehicle which in the last two and one-half years has had a phenomenal acceptance by both the railway industry and our patrons. This vehicle, originally known as the trackless trolley, but now more generally called the trolley coach or the trolley bus, incorporates into one unit many of the most desirable features of both the motor coach and street car. However, the trolley coach will not entirely supplant the motor coach, and it may never eliminate the street car, but bear in mind that in urban transportation it is destined to become a most formidable contender, even though the inherent route flexibility is lacking and the cost of overhead trolley construction and feeder equipment is an item of considerable moment.

In comparing the trolley coach with the motor coach, we find that the former is almost silent in operation; is free from engine odors and carbon-monoxide fumes; has ability to maintain high average and schedule speeds, even under winter operating conditions; has a very simple control; has a low operating cost, and it is believed that the vehicle will have a long life because of the absence of engine vibration; has extremely smooth and rapid acceleration, tests having been made of acceleration rates up to 5.6 m. p. h. per second; the driving mechanism has been entirely eliminated from the coach body, leaving every inch of floor space available for the installation of seats and passenger movement without the necessity for unsightly engine inclosures.

Body and Frame

Reduction of the weight of vehicles used in urban transportation is particularly desirable, because the necessity for a large number of stops per mile makes any excess weight a real burden. It may be desirable, and even absolutely necessary, to provide extremely strong bodies for cross-country motor-coaches, but I do not believe that ruggedness, beyond that which is vitally necessary to withstand the ravages of vibration, is quite as imperative in urban transportation service.

This desire for a light-weight vehicle may possibly be attained by making use of a type body and frame construction similar to that which has already been developed in the construction of the world's great dirigibles. Well insulated, light weight, all metal body construction, with chassis and body built integral, so as to be interdependent for support, would seem advisable.

In addition, the use of more streamlining, and the elimination of all possible projections on the outside of the coach body, to decrease wind resistance, and provide a vehicle having a more pleasing appearance, may be possible. Inside the coach body all possible ramps and steps, and also motor boxes, should be reduced or entirely eliminated, and the wheel housings should be concealed under seats, leaving every inch of floor space available for carrying passengers and for free passenger movement.

Power Plants

Very great improvements have already been made in engines, but even today this extremely vital part of a motor coach remains the particular unit requiring by far the greatest maintenance expenditures. Consequently, any further improvements that can possibly be made to increase the efficiency of the engine and to prolong its life and also lengthen the general overhauling periods will be sincerely appreciated by the operator.

I am not prepared to say whether this improvement should be a further development of the present gasoline engine or whether a substitution of the Diesel engine would be practical, particularly in view of the accomplishments of the Diesel-powered airplane in the recent non-fueling endurance flight in Florida and also the oil-burning racing car at the sweepstakes held at the Indianapolis Speedway on May 30.

While on the subject of engines, it may be well to again refer to the loss of floor or seat space which is occupied by the engine. One of the advantages of the trolley coach is that the driving motors are entirely segregated from the inside of the coach body. Now that the radial engine has proved so satisfactory in airplane performance, could not a heavy-duty, water-cooled type of radial engine be designed and successfully installed, at either the front or the rear of the coach, thus reducing the space occupied by the power plant?

Some airplane engines are built with the crank case on top and the cylinders underneath. The usual coach engine is more than twice as high as it is wide. Would it not be possible to design and efficiently operate the conventional type of coach engine suspended on its side underneath the coach body? If this is not practical, would it not be possible to design and manufacture an efficient opposed engine, to be installed underneath the coach floor?

(Continued on Page 11)

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Utilization of Motor Trucks

(Continued from Page 7)

apparent, as it does not require a large investment in delivery facilities for the summer demand. The company has found it also of advantage to deliver coal during the fall and winter months so as to level up the valley of ice delivery during that period.

In four years, cost per ton of delivered ice has been reduced 21 per cent., while total delivery expense has been reduced 8 per cent., though total tons delivered has increased 17 per cent. During 1930, relay and transfer truck costs decreased $7,031, or 18.5 per cent., from this cost for 1929, and for the same period the cost of operating the transportation department, exclusive of drivers' and helpers' wages, decreased $23,677, or 14 per cent. Many factors were responsible for this improvement, but efficient use of motor truck transportation within the company and efficient use of "peddler" delivery were large contributors. Balance of these two types of delivery is determined by the results obtained.

Few types of utility service require more specialized motor truck equipment than the gas utility. No type of utility service is more difficult to service with motor trucks than a manufactured gas utility, especially in a large city.

The Peoples Gas and Coke Company, which serves Chicago with gas, operates a fleet of 201 vehicles, of which 70 per cent. are motor trucks, and half of these are specialized motor trucks.

From the year 1921 to the year 1930 the number of vehicles in this fleet has decreased 16 per cent., and the total operating cost has decreased 15 per cent., while the output of gas in this same period has increased 60 per cent.

Cost records covering individual vehicles have made much of this saving possible, whereas operating expenses were formerly grouped to cover classes made up of certain types of vehicles. This individual cost system enables us to determine the type of equipment which is most economical, and it has helped all departments and divisions to check routing and change methods of operation. Operating costs, as well as investment expenditures, are controlled by a budget. A summary of trucks not in service by garages has been very helpful in increasing the load-factor on the motor truck equipment. Because of the large amount of specialized truck equipment, it is necessary for each department or division to route and dispatch the motor trucks assigned to it.

Where the saving in cost on new construction, between contracting and doing the work with company equipment, is not sufficient to pay for the new equipment required, new construction is always contracted. Hired truck service is used for temporary work where company equipment is not available and also where refuse can be hauled from gas plants more conveniently on contract.

Wyman station, a hydro-electric development on the Kennebec River, near Bingham, Me., having a capacity of 100,000 horse power, was the largest power development made in 1930 by any of the subsidiaries. It cost $13,000,000. Measured by its prime kilowatt hour output, it is one of the largest hydro-electric developments in the country because of its vast storage capacity.

The dam is of earth fill, with a concrete core wall. Motor trucks, caterpillar trucks and tractors moved all of the material required for the construction of the dam. The earth dam is the largest that has ever been built of dry fill hauled with tractors and trucks. This method permitted care of sorting and placing the different kinds of material. The hauling equipment was assigned to different shovels, according to the kind of fill required in that section of the dam, and was closely regulated by the foremen on the fill. In case of trouble with a shovel, there was always another ready to load the equipment. The geological formation at the site prevented the use of railroad or hydraulic methods of placing the fill.

Two years were required for the construction of a hydro-electric project near Bingham, Me. Trucks and tractors operated throughout the 24-hour period except for an hour's shutdown at noon and again at midnight. In the morning and at the end of the afternoon, drivers were changed without stopping the machines. During the latter period of construction, 10,000 cubic yards of earth were moved into place every day. The construction of an earth fill requires care of sorting and placing of material, and to do this it was necessary to carefully plan and schedule all movements of trucks and tractors. The construction of this project required the moving of about 3,000,000 cubic yards of earth, 250 cubic yards of ledge, and the placing of about 250 cubic yards of concrete. The earth fill was excavated and moved into place at a cost of 67 cents per cubic yard, after liability insurance and depreciation of plant and equipment.

This cost would not have been possible without securing nearly a 100 per cent. load factor on the transportation equipment. It was necessary to keep the greatest possible amount of trucks and tractors in service at all times so as to complete the project with the greatest possible dispatch, and make it possible to obtain income from this large investment, the greater part of which was necessarily idle, until power was produced. It was felt, though, that the high load factor on plant and equipment increased maintenance.

Motor trucks are being more generally used by railroads. The Chicago, North Shore & Milwaukee Railroad, an electric railroad operating between Chicago and Milwaukee, a distance of eighty-five miles, uses a fleet of motor trucks with trailers, and has established what is known as "Ferry Truck Service."

Trailers are delivered to the door of the shipper, who loads the trailers and seals them. The dispatcher is then notified and he sends a tractor to take the trailer to the rail head station. By means of a ramp, the tractor places the trailer on a specially constructed flat car capable of holding three trailers. The tractor is withdrawn after loading the trailer. On arrival at destination, the tractor is driven onto the ramp, coupled to the trailer, and it is then taken directly to the door of the consignee, who breaks the seal and unloads the trailer.

This shipping service corresponds to the trap-car service of railroads, and it results in a great saving in operating cost of the railroad by reason of the fact that the shipment is not transferred into freight cars, and two handling operations are eliminated, that of loading and unloading the shipment. In addition, the possibility of pilferage and loss is reduced to a minimum, and since the trailers are all steel-constructed and water-tight, the possibility of damage by water conditions is negligible.

The advantages on the part of the shipper and consignee are that all cartage charges are eliminated and four handling operations are made unnecessary, that of loading and unloading the truck at both the origin point and the destination point. Moreover, it is not necessary to mark each carton or individual piece. The shipper knows that whatever he loads into the trailer will be delivered intact to the consignee.

In addition to this "ferry service," the North Shore Electric Railroad has 18 off-track freight stations in Chicago where package freight is received or delivered to shippers. The same trailers that are used in the "ferry service" are loaded with package freight at these various stations. When the trailers are loaded, the dispatcher is notified and a tractor then delivers the trailer to the rail head, where the package freight is sorted and loaded into a package rail car.

In addition to this service, a local trucking concern in Milwaukee and one in Chicago own and operate a company which is called the North Shore Forwarding Company. Using the "ferry truck service," this company consolidates small shipments which are loaded in the ferry trucks, giving the shipper the advantage of a lower rate, plus North Shore Service.

The Chicago South Shore & South Bend Railroad, an electric railroad operating between Chicago and South Bend, a distance of ninety miles, is using a "truck" service similar to that used by the North Shore, except that the movement of all trailers to and from stations and shippers to rail heads is done by contracting with a trucking concern. Under this arrangement it is possible for the North Shore to compare the trucking cost of moving its trailers with the trucking cost of the South Shore, where the service is hired service. There are 400 to 500 ferry truck loads per month to and from the Chicago stations.

Recently the Shore Line Forwarding and Distributing Company was organized by a number of trucking companies in Illinois, Indiana, Michigan and Ohio. This concern consolidates package freight in trailers, which are loaded into standard drop-end gondola cars on the South Shore and shipped by rail to and from Chicago and South Bend. The forwarding and distributing company receives the benefit of a carload rate for shipment of these trailers, and the railroad can perform this service at less cost and with more dispatch than a trucking company can haul this freight to and from South Bend and Chicago.

A local freight tariff governed by official classification No. 50 has been approved by the Interstate Commerce Commission and is on file covering this service.

Co-ordination of railway and motor truck operations is gradually being worked out that will permit the motor truck to perform its economic service for the shipper—that of pick-up and delivery, or short haul service—and the railway to perform its economic service for the shipper—that of hauling bulk loads to distances that are too far for the motor truck, or through congested highway areas.

It seems that much of the motor truck service can best be performed under contractual arrangements or by a forwarding and distributing company that is engaged principally in the business of operating motor trucks. This is a field in which it is obvious that savings can be made for the shipper, the railway, and the trucking concern. The benefits that can be derived depend on the proper co-ordination of these various services to their economic field. At present the greatest drawback is the lack of standard conditions and equipment among various truck operators.

In conclusion, it should be stated that the purpose of this paper is to show by some practical examples how the principles of efficient operation are being applied to the utilization of motor trucks in the utility field.

Summarizing, the principles of efficient operation of motor trucks in the utility field are: Standards of performance, records, planning, routing, scheduling, dispatching, standardizing conditions, and standardizing operations.

NEW JERSEY CHAPTER, S. S. E. INSPECTS REFINERY

Bayonne, N. J., June 13.—Members of the Northern New Jersey chapter of the American Society of Safety Engineers made an inspection trip to the Bayonne refinery of the Standard Oil Company of New Jersey yesterday. E. A. Timm of the Standard Oil Company, who prepared the plans for the inspection, was in charge.

The Vapor Lock Problem

(Continued from Page 8)

perature during the runs on each car.

TABLE 2

Fuel Line Temperature Increments Above Atmospheric Temperature, °F.

Car	Fuel Tank Outlet 40 mph	Fuel Tank Outlet Idle	Fuel Tank Outlet Climb	Fuel Pump or Vacuum Inlet 40 mph	Fuel Pump or Vacuum Inlet Idle	Fuel Pump or Vacuum Inlet Climb	Fuel Pump or Tank Outlet 40 mph	Fuel Pump or Tank Outlet Idle	Fuel Pump or Tank Outlet Climb	Carburetor Inlet 40 mph	Carburetor Inlet Idle	Carburetor Inlet Climb	Aver. Atmos. Temp.
A	..	26	..	..	40	..	..	46	..	..	42	..	90
A1	22	28	..	44	57	..	52	67	..	56	61	..	80
B	10	13	19	17	34	26	20	41	48	26	61	37	75
B1	8	11	..	10	11	..	22	47	..	26	59	..	80
C	13	20	24	20	52	38	24	40	36	35	45	50	70
D	18	22	..	36	56	..	47	57	..	50	60	..	70
E	18	22	..	36	40	..	48	60	..	35	37	..	55
EI	29	29	36	42	54	51	44	64	51	40	64	49	75
F	11	21	25	25	56	41	36	61	53	35	69	55	80
G	21	21	28	..	..	..	31	63	41	44	68	57	80
H	20	21	28	49	62	52	73	90	66	60	74	61	65
I	26	34	..	32	38	..	39	56	..	46	64	..	85
J	..	..	..	30	37	37	39	53	45	49	81	57	80
K	18	21	20	34	48	40	49	66	58	50	66	64	80
L	20	..	24	33	51	39	38	38	43	57	87	73	70
M	..	13	..	..	41	..	..	55	..	..	47	..	80
M1	24	27	32	35	53	48	47	69	60	45	62	58	85
M2	15	..	..	14	19	..	29	48	..	33	51	..	80
N	22	25	28	44	55	53	58	72	67	49	64	59	80
N1	16	..	..	15	25	..	32	61	..	34	61	..	80
O	20	24	25	38	47	44	58	77	60	53	66	61	75
P	13	14	..	19	33	..	33	57	..	37	58	..	85
Q	19	..	..	23	49	..	37	70	..	41	76	..	75
R	16	16	..	20	26	..	29	39	..	32	39	..	80
R1	..	13	..	..	32	..	..	49	..	..	43	..	45
S	13	16	..	16	31	..	41	62	..	43	63	..	70
T	..	23	..	..	72	..	..	88	..	..	86	..	70

The average, maximum and minimum observed temperature increments above atmospheric temperature for the various fuel-system locations are listed in Table 3. The large differences between the maximum and minimum values are striking. It is interesting that the temperature of the gasoline in the fuel tank is considerably above that of the atmosphere, the average difference being about 20 deg. F. In going from the fuel tank to the fuel pump or vacuum tank inlet, the gasoline is heated another 11 deg. F. at 40 m. p. h. and 23 deg. F. idling after a 40 m. p. h. run. Passing through the pump or vacuum tank increases the temperature still another 12 deg. F. and 16 deg. F., respectively, on the average. There is little change in temperature on passing from the pump or vacuum tank outlet to the carburetor. It is of interest that the average increase in temperature during the climb up the six-mile mountain is approximately the same as that during idling after the 40 m. p. h. run.

TABLE III

Summary of Temperature Increments

	Av.	Max.	Min.
A. Constant speed of 40 m. p. h.			
Fuel tank outlet	18	29	8
Fuel pump or vacuum tank inlet	29	49	10
Fuel pump or vacuum tank outlet	41	73	20
Carburetor inlet	42	60	26
B. Idling after 40 m. p. h. run			
Fuel tank outlet	20	34	11
Fuel pump or vacuum tank inlet	43	72	11
Fuel pump or vacuum tank outlet	59	90	38
Carburetor inlet	61	87	37
C. Climb up six-mile mountain			
Fuel tank outlet	26	36	19
Fuel pump or vacuum tank inlet	43	53	26
Fuel pump or vacuum tank outlet	54	67	38
Carburetor inlet	56	73	37

Although the values for a constant speed run of 40 m. p. h. only are listed in the table, the temperatures are essentially independent of speed with the exception of the fuel tank temperatures, which show an increase with speed. The effect of speed on the average values for all of the cars is illustrated in Fig. 4, assuming a fuel pump system.

Some very pertinent conclusions can be drawn from the data in Tables 2 and 3. Since the majority of recent cars are equipped with fuel pump systems and since there is a definite trend in that direction, consideration will be limited to such systems. Vapor lock in a fuel pump system normally occurs in the pump and, as pointed out in the section on vapor pressure, the temperature of the fuel at the inlet to the pump is of most significance. Accordingly taking the data for pump inlet temperatures in Table 2 in conjunction with equation (1), the chart shown in Figure 5 can be constructed. The lines represent the atmospheric temperatures at which vapor lock would occur under the conditions specified when using gasolines of various vapor pressures. The ideal line represents a fuel system in which the temperature of the gasoline does not rise above that of the atmosphere. It is the limiting line which can be approached by improvements in fuel line design, but cannot be passed without resource to refrigeration. The space to the right of each line represents a region where vapor lock would occur under the conditions specified on the line, while the space to the left represents a region in which vapor lock would not be expected to occur. The two average lines represent the averages of the pump inlet temperatures in the cars tested, and about half of the cars run in these tests would give vapor lock trouble on fuels which would just be satisfactory in the average of the cars.

It should be pointed out that the vapor pressures in Figure 5 apply to the gasoline in the fuel feed system and not to the gasoline as it leaves the refinery. Accordingly, these vapor pressures values can be

(Continued on Page 12)

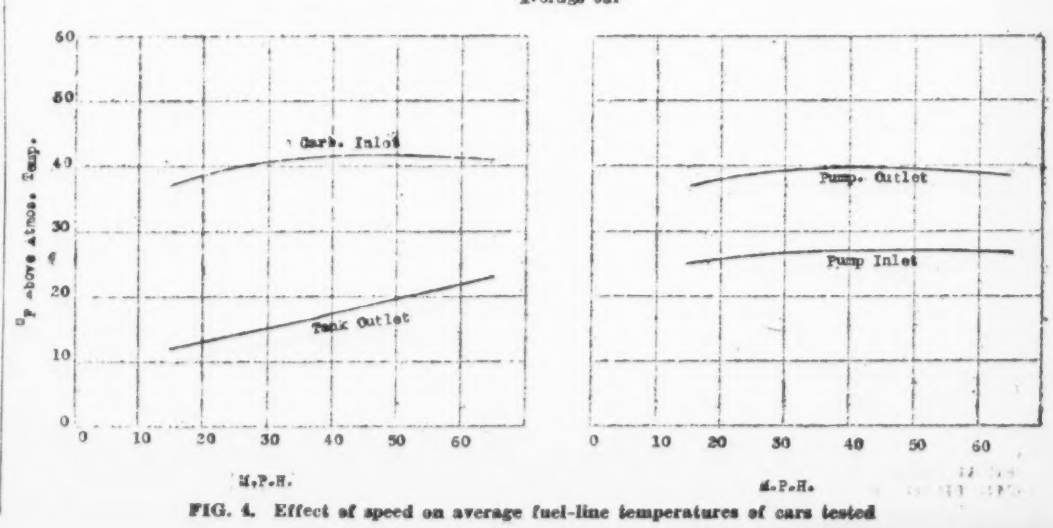

FIG. 4. Effect of speed on average fuel-line temperatures of cars tested

The Uses of Motor Coaches

(Continued from Page 9)

Noxious gases and odors are a source of constant patron complaint with which the operator has been confronted since the very inception of motor coaches, although considerable improvement has been made in this respect, and the original way of heating coach bodies by running an exhaust pipe through the body is largely passing out of existence. This method of heating gave way to the exhaust radiator system equipped with a fan. While this was an improvement, it still had some of the disadvantages of the old exhaust-pipe method. The use of hot-water heat is much more desirable, but requires constant maintenance, and considerable difficulty has been experienced because of the abuse of the engine by the driver.

The new designs proposing the use of low-pressure steam, heated by the exhaust, seem to be a step in the right direction. Coaches must be well heated, particularly in our part of the country, but let us eliminate the carbon monoxide from the coach body without too large an expenditure for the equipment or the chance of abuse.

Especially on large coaches having low-hung bodies, where the exhaust is expelled underneath or low at the rear, considerable trouble is experienced by backdraft drawing the gases up into the coach body. We partly remedied this condition on our larger coaches by installing improvised exhaust piping to the coach roofs, which eliminates unwanted heat and annoying exhaust noises. I firmly believe that the manufacturers should provide the necessary equipment to get the exhaust to the rear of the coach roof as quickly as possible, and that they should use every known engineering facility to keep all obnoxious engine odors and gases away from the coach patron.

Transmissions

Much has been accomplished in providing transmission equipment on coaches to reduce the maintenance and noise and to assure easier operation. The gas-electric drive accomplishes these purposes successfully, but only at the expense of some 2,000 pounds in added weight and several thousand dollars in additional cost of each vehicle so equipped. This additional weight and cost seem entirely impractical on all but the larger motor coaches. Automobiles are now being equipped with syncro-mesh transmission and free wheeling. Is it not possible to provide similar equipment on the motor coach to give added flexibility in operation without seriously increasing the first cost and the maintenance expense?

Because of the multiplicity of the coach driver's duties, the need for easier handling is rightfully recognized as a vital matter; consequently, any improvement in the transmission or, if possible, the elimination of the transmission entirely, seems highly desirable. We of the electric railway industry ask the members of the society what we can reasonably expect along this line. Will it be the use of a power clutch, or some form of a fluid flywheel or clutch to supersede the present flywheel, clutch and transmission and the gas-electric drive?

Steering Mechanism

Much has been said and done about relieving the coach driver from the arduous task of gear shifting, but very little about affording relief from the task of steering. It is true that the present mechanical steering devices on our urban-type coaches are very efficient, but with each increase in vehicle size the steering wheel has been increased in diameter to increase the leverage, compelling our drivers to maintain an unnatural position while steering the coach. A simple, easily maintained power steering device, equipped with a steering wheel similar in size to those on automobiles, would reduce the driver's fatigue and would, I believe, tend to give greater coach flexibility, result in increased schedule speeds and prevent many traffic accidents.

Perhaps the future rubber-tired vehicle will be featured by the reduction of noise to the lowest possible minimum; the use of engineering principles that we now find associated with the production of aircraft, making the coach more accessible by greater facilities for the ingress and egress of passengers; by all means, proper circulation of the passenger movement; greater utilization and more economical use of street space; increased acceleration and deceleration, resulting in higher schedule speeds; increasing the riding comfort to a point where it approximates the facilities now afforded by the private car.

Finally, much thought should be given to the maintenance man's ability to get at every vital part with the minimum of difficulty. Every part should be easily get-at-able. There should be no necessity for using an acetylene torch to perform a simple maintenance operation.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Ford Sales in East Make Better Showing for May

NEW YORK, June 13.—In line with the usual seasonal trend, retail sales of new Ford passenger cars in three Eastern states and the District of Columbia in May showed a slight decline from the preceding month. The decline in the aggregate sales in these states in May from a year ago was less than in the earlier months of the year, however.

The states from which registration returns have been received are Delaware, Maryland, West Virginia and the District of Columbia. The sales in these states in May reached 3,093, as compared with 3,356 in April, off 8 per cent., and comparing with 4,856 in May, 1930, a falling off of 36 per cent.

For the first five months of this year, Ford sales in these states totaled 11,622, as compared with 18,964 in the corresponding period of last year, a decline of 39 per cent.

Ford sales in Delaware in May were 35 per cent. under a year ago and 3.8 per cent. over April. For the first five months, the sales were off 47 per cent. in that state.

Maryland reported May sales were 39 per cent. under a year ago and 6.9 per cent. below the preceding month. The decline for the five months was 44 per cent.

In the District of Columbia May sales were 7 per cent. higher than a year ago and 13 per cent. under April. The five months' decline was 3.9 per cent.

The following tabulations show new Ford car registrations in the reporting Eastern states for the first five months of this year, as compared with the corresponding period of 1930:

	1931	1930
DELAWARE		
January	97	195
February	105	237
March	179	387
April	236	442
May	245	374
Totals	862	1,635
MARYLAND		
January	461	918
February	634	1,087
March	890	1,713
April	1,133	2,016
May	1,055	1,725
Totals	4,173	7,459
WEST VIRGINIA		
January	268	536
February	295	647
March	445	1,013
April	830	1,642
May	794	1,683
Totals	2,532	5,966
DISTRICT OF COLUMBIA		
January	453	820
February	437	580
March	909	873
April	1,157	1,062
May	999	1,069
Totals	4,055	3,904

FIVE YEARS AGO WE PREDICTED THE

DAY WHEN ALL CARS WOULD RIDE ON WHEELS OF STEEL . .

FOR YEARS WE'VE BEEN PLANNING AND PREPA[illegible] FOR THE

DAY WHEN ALL CARS WOULD..TO-DAY 87%* OF ALL CARS DO.

BUDD WHEEL COMPANY

DETROIT . . . . PHILADELPHIA

*ACCORDING TO FIRST QUARTER FIGURES. 87% OF ALL CARS PRODUCED WERE EQUIPPED WITH WIRE WHEELS.

Fuel Line Temperatures

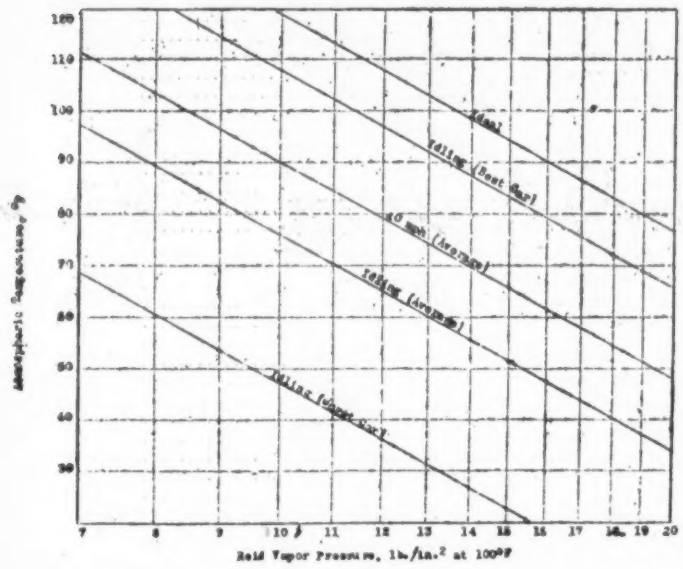

FIG. 5. Relation between permissible Reid vapor pressure and atmospheric temperature

(Continued from Page 10)

increase by about 1 lb./in.² on the average to make them applicable to the product as shipped from the refinery.

Considering an atmospheric temperature of 90 degrees F., the vapor pressure must be less than 16 lb./in.² to prevent vapor lock in the ideal fuel system. On the other hand, the vapor pressure must be less than 8 lb./in.² on idling, and less than 10 lb./in.² when driving at 40 m. p. h. if vapor lock is to be avoided in the average of the cars tested. This difference of 8 lb./in.² in vapor pressure is indicative of the departure of the average fuel system from the ideal system. While the ideal system probably cannot readily be realized, marked improvement in design unquestionably can be made, and it should be possible to reach the line obtained on idling with the car having the lowest temperatures of those tested, designated in the Figure as "Best Car." This would make possible the use of gasolines having vapor pressures as high as 13.5 lb. in.² at 90 degrees F. atmospheric temperature.

An equally interesting comparison can be made between the best car and the worst car tested. At 70 degrees F. atmospheric temperature, freedom from vapor lock requires a gasoline having a vapor pressure less than 7 lb./in.² on idling, with the worst car, and less than 18.5 lb./in.² on idling with the best car. This difference is representative of the extreme variations in fuel system design and fuel line temperatures in present day cars. Neither of these cars are high-priced, nor are they present on the road in small numbers.

The lines in Fig. 5 are applicable to sea level atmospheric pressure. While similar charts could be drawn for other altitudes, it is usually simpler to make correction for this by lowering the vapor-locking temperature 20° F. for every 1,000 feet increase in altitude. A simple rule for change in permissible vapor pressure with temperature is also indicated by Fig. 5, namely that the permissible vapor pressure increases about 2 lb./in.² for every 10° F. lowering of atmospheric temperature. This change is based on the assumption that the increment above atmospheric temperature is independent of this temperature. This is probably not strictly true over wide temperature variations and at low atmospheric temperatures the permissible vapor pressure may be slightly lower than that indicated by the lines.

The marked difference between the vapor-locking lines for present-day cars and for an ideal fuel system raises the question as to what the automotive designer can do to remedy this situation. One of the simplest changes is to transfer the fuel line between the rear tank and the pump to the outside of the frame channel. The effect of this simple change is illustrated in Table 2 for cars M1 and M2 and cars N and N1. For comparison, the increments above atmospheric temperature at the fuel pump inlet are summarized below.

Car	Position of Line	Temperature Increments, °F 40 m. p. h.	Idling
M1	Inside	35	53
M2	Outside	14	19
N	Inside	44	55
N1	Outside	15	25

The decrease in temperature thus effected by this change in fuel line position corresponds to an increase in permissible vapor pressure of approximately 5 lb./in.².

Other simple changes consist in thermally insulating the fuel feed line, in reducing heat conduction from the engine to the fuel pump, by choice of suitable location, in increasing the efficiency of cooling of the pump by the air stream and in shielding the pump from absorption of radiant energy.

It is felt that much can be done in the way of simple modifications, such as those outlined, which will go far to reduce fuel line temperatures to reasonable values. When this is done, the automotive engineer has done his part in connection with the immediate problem of vapor lock and the remainder is largely up to the petroleum refiner.

NAMED DODGE DEALER

Hollywood, Cal., June 13.—Herbert R. Pulver has been appointed Dodge dealer for the Hollywood territory. Pulver was formerly sales manager for C. A. Gray, San Diego Dodge dealer.

FIRST OREGON N. S. P. A. GROUP ORGANIZED

Portland, Ore., June 13.—The first Oregon maintenance group of the National Standard Parts Association was organized at Eugene recently by the Nordling Parts Company, N. S. P. A. jobber of the Willamette Valley.

Officers and committee members are: President, Sam C. Bond, Eugene; vice-president, Gerald Preston, Eugene; directors, John B. Perry, Eugene; Adolph Walder, Eugene; R. W. Brown, Eugene; L. J. McCoy, Cottage Grove, and Mr. Burt, Albany. The membership committee consists of Dolph Howard, John B. Perry and George A. Halton, all of Eugene.

The local organization was formed as the result of a recently launched campaign by the N. S. P. A. to organize independent maintenance men in a division of the international organization. A repair finance plan, flat rate manuals for Ford and Chevrolet and advertising aids are the outstanding features of the program.

NEW JERSEY PLANNING $1,000,000 ROAD PROGRAM

Trenton, N. J., June 13.—Within the next month the State Highway Commission will receive bids for more than $1,000,000 of construction work in connection with the diagonal route from Jersey City to Newark. Estimates will be received June 29 for structural steel for the construction of ramp connections at the Tonnele Avenue circle, Jersey City, on Route 25, and for additional steel in Kearney and in Newark on July 6.

NEW MOTOR BUS LAW IN NEW YORK CLARIFIED BY COL. BLAKESLEE

Glens Falls, N. Y., June 13.—The new law governing the operation of motor bus lines in New York state was explained in an address delivered here by Col. Charles G. Blakeslee, counsel to the Public Service Commission, before the annual meeting of the New York State Conference of Mayors.

The new law, said Col. Blakeslee, permits the commission to

1. Generally supervise omnibus corporations; inspect and examine their equipment; require reports of accidents and investigate the same; prescribe rules and regulations for operations and for safe and adequate equipment.
2. Require filing of annual reports; the furnishing of such information as at any time is necessary; prescribe the methods and form of keeping books and accounts, and when engaged in other or additional business to keep separate accounts.
3. Fix just rates and prescribe rules for the printing, filing and publishing of tariff schedules; hold investigations and hearings, and suspend proposed rates and fix temporary rates when necessary.
4. Approve the issue of stocks, bonds, notes and other securities of a bus corporation, and permit the issuance of securities for reimbursement of treasury during a ten-year period; authorize the reorganization of bus corporations and approve agreements for the same.

FAVOR BUSES INSTEAD OF TROLLEY IN JERSEY

Lyndhurst, N. J., June 13.—Preliminary steps to adopt a plan allowing Public Service Co-ordinated Transport Company to operate a bus line between Hackensack and Lyndhurst and to abolish the trolley line from Valley Brook Avenue, Lyndhurst, to Erie depot, Rutherford, have been taken by the Board of Commissioners. The ordinance was adopted unanimously by the board. A definite date for the new system was not set.

Fight 1931 conditions with 1931 prices!

AUSTIN makes it easy for you to go right out after business—and get it, even in these days of long faces. The reason is—you're armed with something tangible to talk about—new list prices far lower than the lists of any other car!

Your low-cost selling story just begins with the purchase price. For the famous low *running cost* of the bantam Austin puts this car in a class by itself as the least expensive form of automotive travel that can be bought. Tell your customer that he can run his Austin 10,000 miles—a year's driving for the average motorist—for less than $75.00 worth of gas, oil and tires.

Now you can offer six Austin models to choose from—business coupe, runabout, standard coupe, de luxe coupe, cabriolet, panel delivery. Each is smart to look at—comfortable to ride in—sturdy to drive even over long distances. Find out details of the Austin franchise in your locality, learn how Austin is helping dealers and distributors, working shoulder to shoulder in a campaign of aggressive selling and publicity.

Motors!
Bantam Motors *are available for industrial use.*

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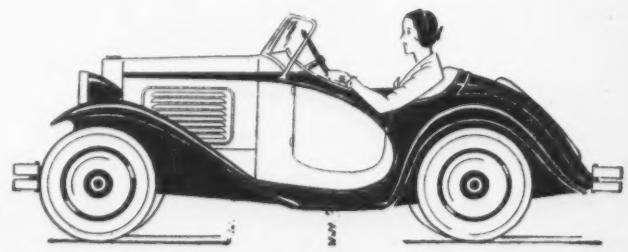

THE AMERICAN AUSTIN CAR COMPANY, INC., BUTLER, PA.